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Preliminary estimating the contemporary sedimentation trend in dry valley bottoms of first-order catchments of different landscape zones of the Russian Plain using the^{137}Cs as a chronomarker

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Abstract

© Published under licence by IOP Publishing Ltd. A general trend of erosion processes over the last 50-60 years can be estimated by dating sediments washed off from arable lands and accumulated in the first-order dry valleys bottoms. Three small (first-order) catchments were chosen as objects of the study. They are located, respectively, in the southern part of the taiga zone, the zone of temperate broad-leaf forests and the forest-steppe zone of the Russian Plain. To date the sediments accumulated in the bottoms the radioactive caesium-137 (137Cs) of global (since 1954) and Chernobyl origin (1986) had been used as a chronomarker. The average (for all the catchments) sedimentation rates during the global137Cs fallout period (1963(1954)-1986) are at least 0.88-2.71 cm per year.For the period that has passed since the Chernobyl accident (1986-2015(2016)) the average rates were 0.15-1.07 cm per year. The greatest reduction in the sedimentation rates is observed in the subzone of the southern taiga, the lowest one is in the forest-steppe zone of the Russian Plain. The main reason for such significant reduction in the rates of sedimentation of the soil erosion products in the dry valley bottoms was a reduction of surface runoff within the catchments during a snowmelt period, as well as crop-rotation changes there.

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